Claims

[c1] 1.A gradient coil assembly for use in an MRI device, comprising:
a first tube extending along an axis including a first conductor;
a second tube disposed generally concentrically about the first tube wherein an inner space is defined between the first and second tubes, the second tube including a second conductor; and,
a fiber composite structure disposed in the inner space operatively associated with the first and second tubes to increase a stiffness of the assembly.

[c2] 2.The gradient coil assembly of claim 1 wherein the fiber composite structure is constructed from a resin and fibers disposed in the resin.

[c3] 3.The gradient coil assembly of claim 2 wherein the fiber composite structure has a fiber to resin ratio equal to or greater than 90%.

[c4] 4.The gradient coil assembly of claim 2 wherein the fibers comprise one of glass fibers, carbon fibers, Kevlar fibers, and aluminum oxide fibers, or a combination of

fibers comprising at least one of the foregoing fibers.

[c5] 5.The gradient coil assembly of claim 2 wherein the resin comprises an epoxy resin.

[c6] 6.The gradient coil assembly of claim 2 wherein a temperature of the resin where the resin becomes non-elastic is greater than an operating temperature of the coil assembly.

[c7] 7.The gradient coil assembly of claim 1 wherein the fiber composite structure comprises a plurality of radially extending fins.

[c8] 8.The gradient coil assembly of claim 7 wherein spaces between each of the plurality of radially extending fins in the inner space is filled with resin.

[c9] 9.The gradient coil assembly of claim 1 wherein the plurality of radially extending fins extend substantially from the first tube to the second tube.

[c10] 10.The gradient coil assembly of claim 1 further comprising at least one viscoelastic member disposed in the inner space to dampen vibrations in the assembly.

[c11] 11. The gradient coil assembly of claim 1 wherein the first conductor is disposed on an exterior surface of the first tube.

[c12] 12.The gradient coil assembly of claim 1 wherein the second conductor is disposed on an exterior surface of the second tube.

[c13] 13.A gradient coil assembly, comprising:
a first tube extending along an axis including a first conductor;
a second tube disposed generally concentrically about the first tube wherein an inner space is defined between the first and second tube, the second tube including a second conductor; and,
a fiber composite structure having resin and fibers disposed in the resin, the structure having a plurality of radially extending fins being disposed in the inner space to increase a stiffness of the assembly.

[c14] 14.The gradient coil assembly of claim 13 wherein the fiber composite structure has a fiber to resin ratio equal to or greater than 90%.

[c15] 15.The gradient coil assembly of claim 13 wherein the fibers comprise one of glass fibers, carbon fibers, Kevlar fibers, and aluminum oxide fibers, or a combination of fibers comprising at least one of the foregoing fibers.

[c16] 16.The gradient coil assembly of claim 13 wherein the resin comprises an epoxy resin.

[c17] 17.The gradient coil assembly of claim 13 wherein a temperature of the resin where the resin becomes non-elastic is greater than an operating temperature of the coil assembly.

[c18] 18.The gradient coil assembly of claim 13 wherein spaces between each of the plurality of radially extending fins in the inner space is filled with resin.

[c19] 19.The gradient coil assembly of claim 13 wherein the plurality of radially extending fins extending substantially from the first tube to the second tube.

[c20] 20.The gradient coil assembly of claim 13 further comprising at least one viscoelastic member disposed in the inner space to dampen vibrations in the assembly.

[c21] 21. A method for assembling a gradient coil assembly for use in an MRI device, comprising:
disposing a first gradient tube generally concentrically about a second gradient tube wherein an inner space is defined between the first and second gradient tubes; and,
disposing a fiber composite structure in the inner space defined by the first and second gradient tubes.